UNIVERSITY OF COPENHAGEN

Public participation – a loser's game?

Lassen, Jesper; Nielsen, Annika Porsborg; Sandøe, Peter

Published in:
People & Science

Publication date:
2011

Document version
Publisher's PDF, also known as Version of record

Citation for published version (APA):
Lassen, J., Nielsen, A. P., & Sandøe, P. (2011). Public participation – a loser's game? *People & Science*, (6), 23.

Download date: 05. maj. 2023

BRITISH SCIENCE ASSOCIATION

PEOPLE & SCIENCE

JUNE 2011 WWW.BRITISHSCIENCEASSOCIATION.ORG £6

Re-engagement at the Royal Society: Wendy Barnaby interviews Paul Nurse

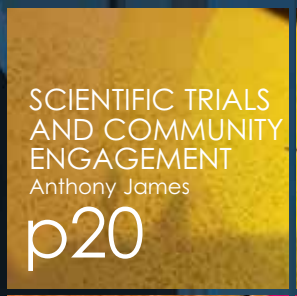
Public participation - a loser's game

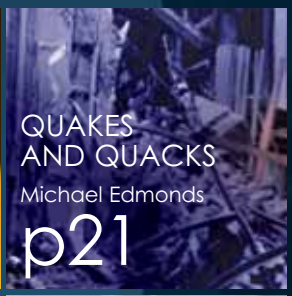
Explaining statistics

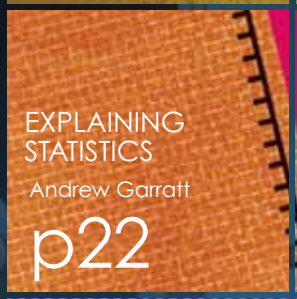
CONTENTS

PEOPLE & SCIENCE

June 2011 | **FEATURES**







EDITOR Wendy Barnaby

SHORTS EDITOR Joanna Carpenter

CHAIR OF EDITORIAL COMMITTEE
Nancy Lane

EDITORIAL COMMITTEE
Anjana Ahuja, Lloyd Anderson, Sheila Anderson, Martin Bauer, Clive Cookson, Peter Cotgreave, David Fisk, Fiona Fox, William Gosling, Ken Okona-Mensah, Elizabeth Seward

MULTI-READER SUBSCRIPTIONS
United Kingdom: £60
Europe outside UK: £70
Outside Europe: £80

People & Science is one of a number of free publications available to individual members and supporters of the British Science Association. For free subscription, visit **www.britishscienceassociation.org** or contact the supporter development team by calling 0870 241 0664 or emailing **supporters@britishscienceassociation.org.**

The magazine is available at its website, **www.britishscienceassociation.org/ps**

EDITORIAL ADDRESS
People & Science, The British Science Association, Wellcome Wolfson Building, 165 Queens Gate, London SW7 5HD

wendy.barnaby@britishscienceassociation.org

People & Science is published four times a year.

Unless otherwise stated, the British Science Association retains the copyright of everything in *People & Science*.

The views expressed in this publication do not necessarily reflect those of the editorial committee or the British Science Association.

© 2009 British Science Association

The British Science Association is a registered charity No. 212479 and SCO39236

ISSN 2040-3968

Designed by: Savage and Gray **www.savageandgray.co.uk 4678/11**

Printed by: Holbrooks

Printed on FSC certified recycled paper

Original cover image: © The Royal Society

BRITISH SCIENCE ASSOCIATION

www.britishscienceassociation.org

PUBLIC PARTICIPATION – A LOSER'S GAME?
Jesper Lassen, Annika P. Nielsen & Peter Sandøe
p23

EDITORIAL

Photo: Horst Friedrichs

It's good to hear that the Royal Society's President, Paul Nurse, thinks it's time to revisit engaging the public during the Society's major studies. In a wide-ranging interview (p8), the genial supremo at Carlton House Terrace recalls his early enthusiasm for engagement and reflects on the contribution the Society can make. He ranks the UK well up the scale in the global engagement effort, and is convinced the country should embark on another public debate on GM. He has definite ideas about how it should begin.

Nuclear power also needs another engagement, according to Alister Scott and Jim Watson (p12). Political debate on energy security has often been simplistic, narrow and closed, they write. Following Fukushima, both proponents and opponents of nuclear power need to be more humble about what they do and don't know. Democratic debate about our choices over technology needs respectfully to embrace the full range of views.

Disasters make us stop and think. Thus Michael Edmonds (p21) reflects on the very different public status of science after the first and second of Christchurch's recent earthquakes. The first made local geologists into heroes; the second sent many people running to pseudoscience. 'How do we reassure the public,' asks Edmonds, 'when science seldom provides the type of absolute answers that would perhaps comfort them?'

The conduct of future engagements is the subject of the Spat (p10). Patrick Middleton and Sophie Collins lock horns about whether online or offline is best. 'It's us as people, in the flesh, that makes for good public engagement,' argues Middleton; but Collins counters that if policy makers used online methods to engage directly with the public, they'd be exposed to more viewpoints in a deeper process than face-to-face interaction can provide.

Popular stereotyping would rate women better than men in face-to-face encounters. Uta Frith resists such prejudice in the Exchange (p18), which provides some personal takes on whether women are changing science. Frith would prefer gender to disappear altogether from such discussions. Mary Collins recounts her conversion to the value of rules which can help women, and Carol Robinson argues that women would be keener on a scientific career if they emphasised the good things it can bring.

New ways of talking about science are explored in Two Views (p14). Fran Balkwill and Sophia Petit-Zeman agree that scientists should embrace current calls for them to engage, and talk about their use of animals in experiments. Climate change provides the other case study for another Two Views (p16). David Mackay praises the online tool developed by the Department of Energy and Climate Change so that the public can experiment with the UK's future energy balance. Nicola Frost is, however, less impressed with the online debate that accompanies the initiative.

Wendy Barnaby is Editor of *People & Science*
wendy.barnaby@britishscienceassociation.org

Sentimentality, sci-democracy and science

Ollie Christophers

The CREST Awards are turning 25!

And we're getting a bit sentimental about the thousands of students who've received a CREST Award over the years. In fact, we're trying to find award winners from every year of CREST's existence to help celebrate the birthday.

If you have a CREST Award, join our CREST Alumni Network and connect with your CREST roots, hear inspirational stories from students attending national and international events – and from alumni who have since gone on to have outstanding careers. We also let you know of other competitions, funding sources and opportunities available through the British Science Association and our other partners that may be of interest.

It's free to join the CREST Alumni Network (and quick and simple). Visit **www.britishscience association.org/crestalumni** to sign up.

SciDemocracy – the future of dialogue?

The Science in Society team has completed a pilot project that could make it easier to deliver public opinion straight to the heart of government.

'SciDemocracy' harvests the wealth of debate that arises from the hundreds of café scientifiques, skeptics in the pub, lectures, science festivals and workshops nationwide.

In partnership with Sciencewise and Dialogue by Design, views about science, technology and the future of humankind have been collected from audiences at the North East and Midlands Branches, the Cambridge Science Festival and the Royal Institution. By sending these on, we hope to deliver an accurate snapshot of public opinion straight to policy makers quickly, easily and cheaply.

Discover the British Science Festival

For a whole week in September, people from Bradford, the region, the UK and beyond will come together to celebrate the achievements of science, engineering and technology; to question top researchers about their work, explore ethical concerns, and to enjoy a host of interactive activities for the whole family.

The British Science Festival offers a unique chance for residents and visitors to Bradford to question over 300 of the UK's best scientists about what they are doing and why.

Explore the latest scientific crime-busting techniques or debate the ethics of using human or animal tissue in medical research. Does Nature really provide all we need for our health and hygiene? What have scientists recently discovered about the human brain? What can science tell us about who we are, where we have come from and where we might end up? Our free programme of talks, discussions and debates is sure to pique your interest and rouse your passion.

Winners of the National Science & Engineering competition 2011

Congratulations to Hannah Eastwood, who was named the UK Young Scientist of the Year, and Andrew Cowan, who was named the UK Young Engineer of the Year in this year's National Science & Engineering Competition at The Big Bang: UK Scientists' & Engineers' Fair.

The Science in Society team has completed a pilot project that could make it easier to deliver public opinion straight to the heart of government

Hannah's project explores how chromium can be removed from drinking water, in order to purify tap water and reclaim it for the steel industry where it is a valuable resource.

Andrew's project is a Search and Rescue Robot. This low-cost project includes a camera and fire extinguisher which allows the user to control the robot and view environmental information from a remote control panel.

For more information, please visit **www.thebigbangfair.co.uk/nsec**

The Big Bang regional fairs

The 2011-12 round of the National Science & Engineering Competition has now opened. Big Bang Fairs are taking place in 11 locations throughout the UK between 21 June and 14 July 2011, and some lucky students will be selected to represent their region in the competition finals at The Big Bang in March 2012.

For more information, please visit **www.thebigbangfair.co.uk/nearme/**

Ollie Christophers is the British Science Association's Communications Officer
ollie.christophers@britishscienceassociation.org

Vince Cable enjoys engaging with frictional coefficients at the Big Bang

A place in the sun

Karen Folkes shines a light on the Science and Society programme

Mixed messages on public engagement

Our three-yearly Public Attitudes to Science survey[1] has mixed messages for those of us involved in public engagement. Half of those surveyed feel they see and hear too little information about science, whilst 56 per cent do not feel well informed about scientific research and developments. While 82 per cent of the survey sample agreed that 'science is a big part of our lives and we should all take an interest', only 67 per cent seemed to agree that they themselves backed this up with personal interest.

Interestingly, almost exactly the same results were obtained from our survey of 14-16 year olds which was published during National Science & Engineering Week. However, there still seems to be an appetite to know more about the research and developments that are taking place.

Minister's comments

'It's encouraging that people are increasingly interested in research and new developments,' said Science Minister David Willetts, responding to the survey. 'However, more disappointingly, at the same time they feel less informed. People want more information and to engage with these subjects in a way that's relevant to them. That's a very clear message which Government has an important role in responding to,' he said.

'That's why we have a £13 million commitment in the science budget in this year alone for outreach in schools and public engagement,' he continued. 'This will support flagship schemes such as the Sciencewise Expert Resource Centre, which gives the public opportunities to get involved in shaping future science and technology policy. We have also committed to renewing the £6.3m support for STEMNET, an organisation that helps young people understand the amazing range of careers that can come from studying these subjects.'

Raw data

The survey once again showed perennial issues with trust in both business and government use of science, which have implications for scientists in both settings. That 'hierarchy of trust' was also evident in the way in which people approach the science that they hear and read about, with radio and television seen as more 'trustworthy' than science presented in newspapers.

Given that the data were collected towards the end of a year dominated by science coverage on the BBC, and ever more efforts from the public engagement community to communicate science, it was a surprise to us that there was a fall in the number of people feeling informed. We started to assess this at the workshops held after the quantitative research, but this could be unpicked further, as could other aspects of the data.

We're pleased that, in the spirit of transparency, we have for the first time made the raw data available for those of you with an interest. The 2008 and 2005 survey data is also available and we're looking forward to seeing how they will be used.[2]

Investment reaffirmed

Kicking off another successful National Science & Engineering Week, the Big Bang Fair and the National Science & Engineering Competition brought a record 30,000 visitors. A poll of the young people who went revealed a positive attitude to a career in science and engineering.

To continue this positive trend, BIS has reaffirmed its investment in outreach in schools and public engagement. We will continue to support events which give the public (both young and old) an opportunity to meet scientists and see how science applies to real life situations. We have committed to renewing support for STEMNET[3] and the STEM Ambassadors programme to help young people understand the amazing range of careers that can come from studying STEM subjects. And we are continuing with the Sciencewise public dialogue programme,[4] bringing public views into science policy-making.

Science engagement still has its place in the sun!

1 See **www.bis.gov.uk/policies/science/science-and-society/public-attitudes-to-science-2011**

2 See our video on YouTube: **www.bis.gov.uk/policies/science/science-and-society/public-attitudes-to-science-2011**

3 See **www.stemnet.org.uk/**

4 See **www.sciencewise-erc.org.uk/**

Karen Folkes is Deputy Head of the Science and Society team of the Department for Business, Innovation and Skills (BIS)

scienceandsociety@bis.gsi.gov.uk

Fukushima media row

A row has blown up over science in the media after Fiona Fox, Director of the Science Media Centre, criticised reporting of events at the Fukushima nuclear plant in Japan following the earthquake and tsunami on 11 March.

Another Chernobyl?

'Why did almost every section of our media lead daily reports with "another Chernobyl" or the coming apocalypse, when none of Britain's leading scientists or the Chief Scientific Adviser were in any way confirming that assessment?' she wrote in a blog post on the BBC's College of Journalism website.

She continued: 'I think one reason why the more measured and cautious reactions from SMC's experts were disregarded by sections of the media was that they are nuclear experts and therefore seen to be pro-nuclear, with a vested interest in playing down the threat.'

Counterproductive resassurance

Yet in an opinion article in *Nature* Colin Macilwain, freelance science writer and former editor of *Research Research*, commented that 'the collective impression [of nuclear experts] has been unconvincing: defensive, selective, condescending towards public fears and, in my view, ultimately counterproductive. Their combined message seems to have been: don't worry, things are under control, and Fukushima is not Chernobyl.'

Macilwain continued: 'Reassuring soundbites offered to journalists by the London-based Science Media Centre in the days immediately after the earthquake contained barely a cautionary note on how serious the situation at Fukushima was set to become.'

Fiona Fox disagrees. She told *People & Science*: 'I just could not differ [from Colin Macilwain] more. I've spent three weeks now almost totally in the company of these experts. I think they have been brave and committed to engaging with the public. They weren't prepared to go beyond what they knew to be facts and start talking about potential Chernobyls. I can see that, at times, in the early days, they may have looked like they were reassuring, but if you look at what they actually said, they weren't saying this is not a problem or a serious incident.'[1]

Reassuring soundbites offered to journalists by the London-based Science Media Centre in the days immediately after the earthquake contained barely a cautionary note on how serious the situation at Fukushima was set to become

On 12 April, a month after the earthquake and tsunami, the Japanese government provisionally upgraded the incident to the maximum level of seven on the International Nuclear and Radiological Event Scale – on a par with the Chernobyl accident. The change followed a re-classification of the accidents at units 1, 2 and 3 of the plant as one event. It was estimated that the total radiation emitted at Fukushima by that date was 10 per cent of the total radiation emitted at Chernobyl.

1 See **http://www.sciencemediacentre.org/pages/press_releases/**

NEWS IN**BRIEF**

Calling Big Bang

STEMNET (the Science, Technology, Engineering and Mathematics Network) is currently calling for companies to get involved in The Big Bang Regional Fairs to take place around the country over the summer, including on 22 June at the Science Museum. More than 3,000 young people are expected to enjoy STEM demonstrations. Contact STEMNET on info@stemnet.org.uk. **www.thebigbangfair.co.uk**

Cut the Deficit model

Deficit model thinking remains prevalent among bench scientists and engineers, science/health regulators and medical/health personnel, according to a new study published in *Science Communication*. John Besley and Andrea Tanner of the University of South Carolina gauged the views of around 150 science communication trainers.

Evaluation

Evaluations of two public dialogues have found that a mix of methods is largely successful and that it could be helpful to provide support such as additional reading materials for expert scientists, who 'were concerned about introducing bias into groups.' The dialogues were on synthetic biology and animals containing human material. See **http://tinyurl.com/692672z** and **www.acmedsci.ac.uk/index.php?pid=240**

Have your say on libel reform

The joint Commons/Lords committee of Parliament scrutinizing the government's draft Defamation Bill until 19 July has invited written submissions to assist it. Views on questions available online **http://tinyurl.com/3zdy366** can be submitted by email, preferably by end of May but certainly before 10 June to defamationbill@parliament.uk

Another engagement on GM?

The Sciencewise-ERC steering group has set up a subgroup to look at what can be learnt from various public engagement exercises on GM.

'We've been asked [by the steering group] to think about whether it's worth recommending more dialogue on GM,' Jack Stilgoe, chair of the Sciencewise group, told *People & Science*.

'GM is such a complicated issue that it depends what sort of dialogue you want to get involved in. GM ten years ago was very different from GM today. The science has moved on, regulatory discussion has moved on, industry are doing other things. But the issue is highly politicized with entrenched positions on both sides, and a history of acrimonious debate,' he continued. There's no fixed date for the end of the work or the form its output will take. 'We might not issue a big report… [we may instead] have a workshop with policy makers,' he said.

Starting with the problem

David Baulcombe, Professor of Botany at the University of Cambridge, chaired a Royal Society group that proposed[1] that public dialogue should start with the problem of sustainably intense agriculture, rather than presuppose any particular technological solution.

'How do you protect plants against disease, for example? Or how do you grow crops, confronted with the challenges of climate change and water shortage?' Sir David told *People & Science*. 'If you have a discussion in those terms… you're weighing the pros and cons of different technologies and thinking about the impact that crop has on the environment, on the society in which it is grown… and so on. That allows the discussion to be a lot more constructive than it's been in the past,' he continued.

'A lot of people who are opposed to GM, certainly when you talk to them off the record, will tell you that it is not so much GM that they're opposed to but the involvement of big business and large multinational corporations.'

GM ten years ago was very different from GM today. The science has moved on, regulatory discussion has moved on, industry are doing other things

China

That also seems to be the case in China, where Richard Stone, Asia editor of *Science* magazine, has found similar criticism. He told *People & Science*, 'Polls show that [Chinese] people support GM crops. Generally speaking, they aren't too concerned about the safety of GM crops. But they are concerned about a perceived movement by foreign companies to control GM commerce.'

The Chinese government has plans to expand science communication activities, possibly involving dialogue, in its next five-year plan: 'They acknowledge that just passively putting out information and hoping it gets absorbed has generally not worked,' said Stone.

1 http://royalsociety.org/reapingthebenefits/

Dr Joanna Carpenter is the Shorts Editor
joanna.carpenter@cantab.net

Counting bodies

An objectifying gaze, in which a woman's body is visually inspected, reduces her maths proficiency, according to research published in *Psychology of Women Quarterly*. This may be because the gaze 'conveys that women's looks are valued over their other qualities,' write the authors, led by Sarah Gervais of the University of Nebraska-Lincoln.

Royal Society exhibition

This year's summer science exhibition, *Science Live*, will be held at the Royal Society from 5-10 July at Carlton House Terrace in London. It's open to all for free. Visitors can test their skills at spotting danger in baggage x-rays and more. See **http://royalsociety.org/summer-science/2011/** and **http://twitter.com/summerscience**

Popular robots

'Robotics researchers are investing considerable time and effort in engaging publics,' according to Clare Wilkinson, Karen Bultitude and Emily Dawson of the Science Communication Unit, UWE, Bristol. However, they also warn in *Science Communication* that, 'while the language of engagement has been embraced', the level of engagement varies.

Hidden Science Map

An online 'hidden science map' has been created by the Science Council, to inspire the next generation of scientists. Anyone working in science or a science-related job is encouraged to enter their details on a map to show that science is done by all sorts of people all over the UK. See **www.hiddensciencemap.org/about**

© The Royal Society

Re-engagement at the Royal Society

Wendy Barnaby interviews **Paul Nurse**

Sir Paul Nurse, President of the Royal Society, thinks it's time to revisit public engagement as part of the Society's major studies. 'I'd like to see this possibility discussed,' he says. 'We should at least consider whether we should do that routinely.'

His conviction that scientists need to listen to people goes back a long way.

Undergraduate enthusiasm

In 1967, he went as an undergraduate in Biology to Birmingham University (having been given special dispensation to enrol without the obligatory qualification in French, which he kept failing). In 2000, when he was Director of the Imperial Cancer Research Fund, he was appointed to run the Royal Society's Science in Society programme. It lasted until 2007, when its dedicated funding stopped. His argument for the programme turned out to be a case of history repeating itself.

'I wrote a paper on science and society in 1968 that I'd completely forgotten about,' he told me. 'It was probably for our student mag; I can't remember. When I was packing up to go somewhere a couple of years ago I found it, and I started reading this thing. I thought, "This is really interesting!" - and I looked to see who had written it and I found it was me! It was almost what I then wrote 30 years later – we need to talk to the public; we need to justify what we're doing; we need to engage.'

Licence to operate

There's a phrase from Patrick Jenkin's 2010 report[1] that sticks in Nurse's mind: that scientists need to earn their 'licence to operate'. 'Engagement', he says, 'is part of the process of earning and keeping your licence.' Engagement is necessary, he thinks, for enabling good policy-making on issues involving science.

'When there are desperate circumstances, individuals do look for control and they turn to people who offer control,' says Nurse. 'Scientists on the whole don't do that'

He recalls his time at the Imperial Cancer Research Fund. 'We had a lot of engagement there. What is important here is building up trust in the individuals doing the research.

If you have a very good and open relationship with them, they trust you'll make judgements which are sensible and ultimately could be for their benefit. If on the other hand you as scientists push them away, you will encourage suspicion and a lack of trust and you will encourage forces which will want to take over the decision making.'

GM

Nearly ten years after the GM Nation debate, I ask, should we have another public dialogue on GM? He answers without hesitation: 'Yes. The GM engagement was a mess. We didn't ask properly the questions the public were interested in. We did a survey afterwards and found that the most common concern which was stated was that the public didn't want to eat food with genes in it. It's not a question that scientists would think of. We needed to explain that and we didn't.

My starting point would be to have a serious consultation with the public to get an idea of what they really think are the issues and how many of them think it. Then that should inform a subsequent debate about what the issues are that we have to deal with.'

No lessons from the US

The new President shared the Nobel Prize in 2001, for work on regulators of the cell cycle. Along with his Royal Society post, he is CEO and Director of the new UK Centre for Medical Research & Innovation. He has been President of Rockefeller University since 2003. Does he think the United States has anything to teach the UK when it comes to public engagement? 'Almost nothing. There's gut enthusiasm for science there, but in terms of dialogue they look to the UK.' When it comes to engagement, he says, the UK is 'somewhere near the front.'

Liberal support

Sir Paul thinks the Royal Society should make science exciting and interesting to the public. He acknowledges the other tillers of these particular fields – 'we're only part of the whole framework' – and here he stumbles, wanting to refer to the British Science Association but falling back on 'the BA'. ('I wouldn't have changed the name of the BA. I think it was daft.') He also cites the Royal Institution. ('The RI is obviously in a muddle at the moment and we must hope they can get out of it.')

Apart from its lectures, webcasts and media presence, Nurse thinks the Royal has a particular contribution to make 'because of the way we fund excellence and are rather liberal about it.'

Thus the Society can fund Brian Cox, who is a Royal Society university research fellow, and not worry too much if his research is suffering while he makes TV programmes.
'We have contributed in a small way to the most important current communication of science in Britain,' says Nurse.

Science and pseudoscience

I ask Sir Paul what he thinks of events in Christchurch (see p21 of this issue). After its first serious earthquake, earlier this year, local geologists 'attained an almost rock star drawing power, with public lectures on the earthquake filled to overflowing,' as author Michael Edmonds relates. After the second, devastating earthquake however, people looked to pseudoscience for answers.

'When there are desperate circumstances, individuals do look for control and they turn to people who offer control,' says Nurse. 'Scientists on the whole don't do that. Long-term trust depends on honesty. We can't over-claim. We have to be what we are. Certainty is attractive to the public, but we have to admit we don't know things. You need to build a culture which has such respect for science that charlatans don't get a look-in.'

A firm foundation for this would be science education which produces school-leavers who 'know enough about science to distinguish astronomy from astrology.'

Scientists alone cannot fashion such a society. They 'should be working with social scientists because we are part of society. Some of my colleagues may not feel comfortable with that, but if you're trying to influence public policy you have to have good science and then you have to know how to interact with society to communicate that.'

Prepare for big questions

Nurse is a geneticist whose genetic background was hidden from him by his family. He recently discovered that the people he thought were his parents were actually his grandparents. He has written that this didn't really change anything for him: 'I was brought up by loving grandparents and had a happy childhood.'

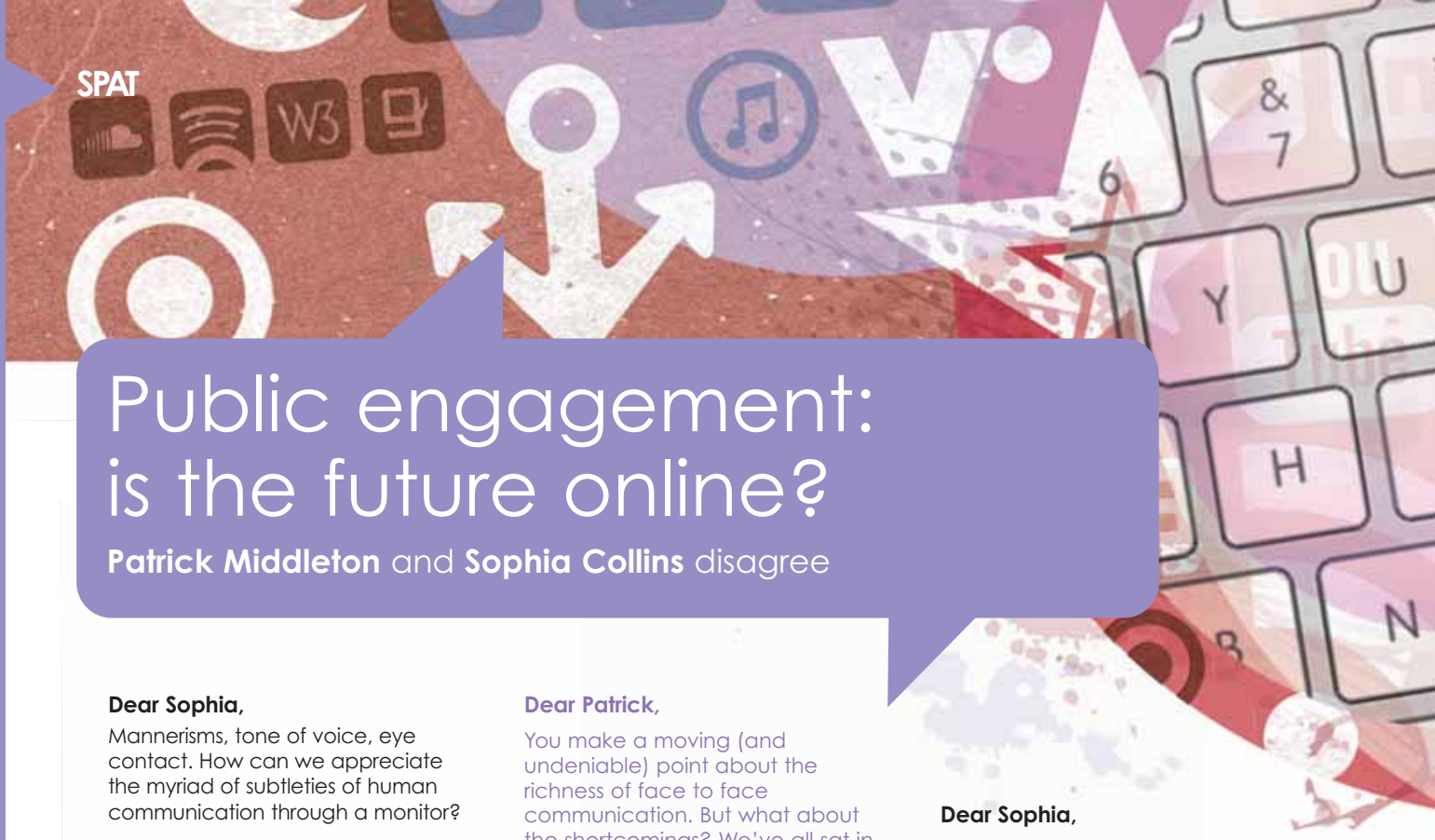
It's a story that illustrates the weight of the environment end of the nature/nurture balance. Faced with a media, however, which likes to overplay the importance of genes by describing 'genes for…', how does he think we should be dealing with a debate so often out of kilter?

The fact that we're the product of genes and environment 'informs discussions about what we are and should inform discussion about our responsibility for our actions,' he says. 'Merely stating that has implications for how we think about ourselves in a whole variety of ways, including justice. And we need to discuss that. As we gradually get more and more information about genes and what we have, and as we get to understand human physiology and behaviour better, these sorts of questions will pop up. And it'd be a good idea if we were prepared for it.'

When it comes to acting on the big questions, engagement is key.

1 www.parliament.the-stationery-office.co.uk/pa/ld199900/ldselect/ldsctech/38/3801.htm

Wendy Barnaby is Editor of *People & Science*
wendy.barnaby@britishscienceassociation.org



Public engagement: is the future online?

Patrick Middleton and **Sophia Collins** disagree

Dear Sophia,

Mannerisms, tone of voice, eye contact. How can we appreciate the myriad of subtleties of human communication through a monitor?

Let me say upfront that online engagement has its place but, in the rush to embrace new shiny media, we risk losing sight of what we're trying to achieve. The list of motivations for public engagement is long, from inspiring to informing to involving. How we go about doing it is equally varied, but it's us as people, in the flesh, that makes for good public engagement.

You'll be familiar with the sorts of statistics which show that when people talk together it's the richness of non-verbal communication that helps us to really interpret and understand what's being said and what each person is feeling. Emoticons can only go so far in helping us express the sentiment behind our words ;-). Even webcam conversations are stilted and joltingly unrewarding.

For convenience and the illusion of inclusivity the online environment can't be beaten – but for nuanced, in-depth, fulfilling discussion no online tool comes close to looking someone in the eye as they tell you what their hopes and worries are.

Regards,
Patrick

Dear Patrick,

You make a moving (and undeniable) point about the richness of face to face communication. But what about the shortcomings? We've all sat in talks where 'Does anyone have any quick questions?' is misheard by a few to mean, 'Please give us a rambling explanation of your thoughts on a tangentially related matter,' while most of the audience sit there impatient but shy about putting their hands up.

That's just one example, but the truth is, not everyone contributes equally in face-to-face conversations. Online environments can be freeing. People who are quieter in person have the space to give their own thoughts. People can ask for explanation about things they don't understand, without feeling they look stupid. There's less pressure to give 'socially desirable' responses and people can be more honest.

Not to mention the convenience in time and space. People can contribute from wherever they are, with whatever time they have. They don't have to travel anywhere, find babysitters, miss work.

I agree I don't want to replace face-to-face completely. Online is an additional channel, but it's got so much potential. So far we are just standing at the shore of it, paddling out a few metres. I want to see what we can achieve once we truly explore.

Regards,
Sophia

Dear Sophia,

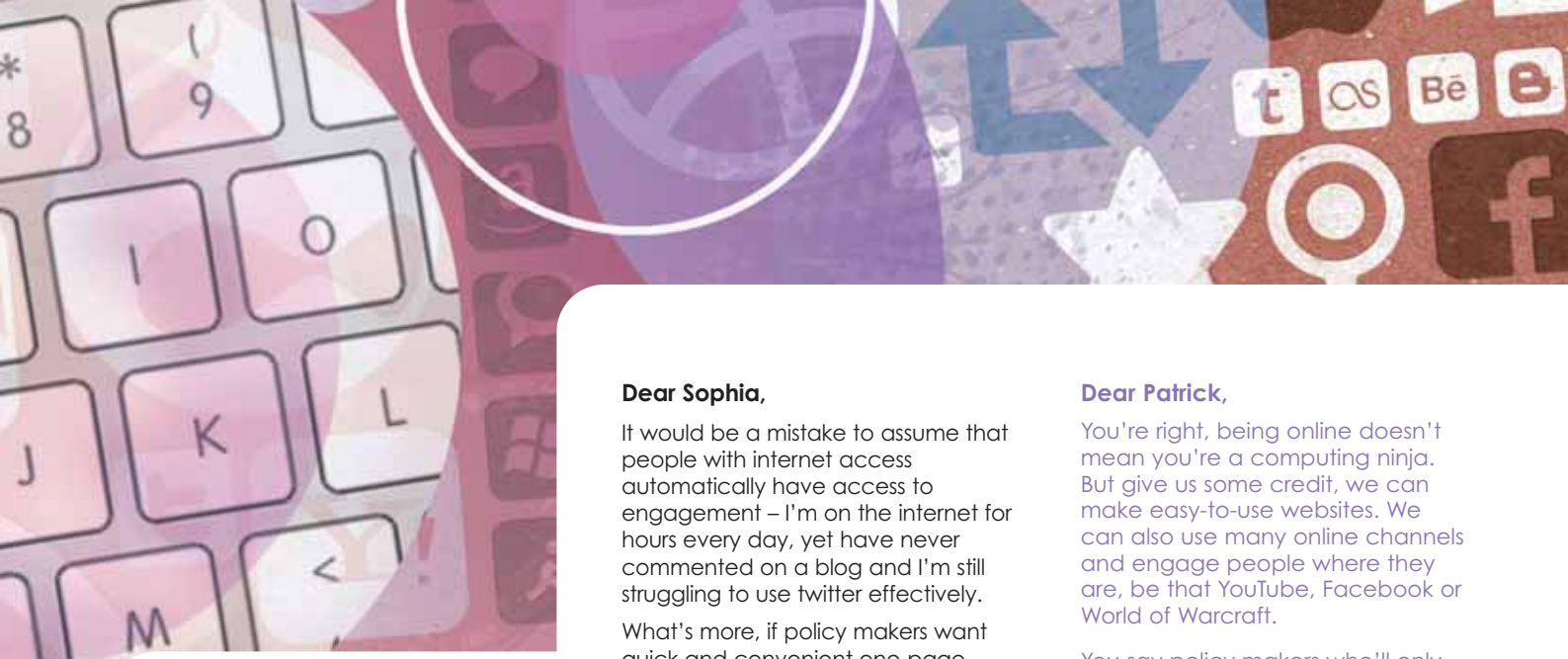
Social situations can be difficult or awkward and people can be excluded from conversations or feel uncomfortable voicing their opinions. You're probably right that the protection offered by online engagement lessens some of these barriers (though no doubt erects others).

Of course, public engagement practitioners use many techniques to lower these barriers in non-online contexts: breakout groups, post-it notes, feedback forms, role play, video, graphic facilitation… the list goes on.

We should be wary of thinking of online engagement as a magic bullet. As you say, online engagement allows people to contribute in ways that fit with their lifestyles. This is a real positive. But what do we lose by moving online? You and I, and probably many people reading this, are comfortable using online tools but many people aren't.

While we see people responding to tweets, commenting on blogs and engaging in discussion forums, there are lots of groups being excluded, from those without access to those who aren't comfortable online. What's more, these groups are likely to have considerably different world-views and opinions from us. How can online engagement capture this diversity, and not leave people stranded on your metaphorical seashore?

Regards,
Patrick



Dear Patrick,

It's true that not everyone has the means to contribute online. But what are the real facts?

In the UK, in 2010, 30.1 million adults accessed the internet every day or almost every day.[1] That's 60 per cent of the adult population.

Can we really say that more people are excluded from online engagement than other methods? Are you saying that offline methods include everyone?

The excellent work that BBSRC does in consulting the public about science policy is a good example of public engagement. But how many people attend a synthetic biology workshop, or sit on a nanojury?

I'm told that what policy makers want, from a public consultation exercise, is a one-page summary of public views. How much of the deep discussion offline filters through to that magic single page?

When we run *I'm a Scientist, Get me out of Here!* events, each scientist takes part in hours of live chat, and also gets sent hundreds of longer-form questions. They emerge with a complex, nuanced picture of the views of teenagers on science. If policy makers used online methods to engage directly with the public, they'd be exposed to more viewpoints, they'd have their assumptions questioned. The process would be deeper, and more democratic, than anything we have at present.

Regards,
Sophia

1 **http://www.statistics.gov.uk/cci/nugget.asp?id=8).**

Dear Sophia,

It would be a mistake to assume that people with internet access automatically have access to engagement – I'm on the internet for hours every day, yet have never commented on a blog and I'm still struggling to use twitter effectively.

What's more, if policy makers want quick and convenient one-page summaries then it seems unlikely they'll have the time for 'hours of live chat' and 'hundreds of questions' (barring, perhaps, occasional outings on mumsnet!).

For me, clarity of purpose should be what defines public engagement: why are you doing it and what do you hope to achieve? Maybe you want to hear what religious groups feel about your science or inspire school children or foster reflection in researchers.

Do you want to hear all the views out there, or just the loudest voices; are you hoping to change yourself or influence others?

Once clear on purpose, we can begin to think about how to achieve our aims. Undoubtedly, online engagement can sometimes be the best tool for the job (as in *I'm a Scientist*). But, at the risk of repeating myself, we must be wary of zeitgeists. For some, the online bandwagon is worth jumping on. For others, the lure of shiny new media is best avoided.

Regards,
Patrick

Dear Patrick,

You're right, being online doesn't mean you're a computing ninja. But give us some credit, we can make easy-to-use websites. We can also use many online channels and engage people where they are, be that YouTube, Facebook or World of Warcraft.

You say policy makers who'll only read a page won't want to spend hours in something like *I'm a Scientist*. It's true, but isn't it a bit of a con? Consultation participants think they've been listened to, they think they've contributed depth, but in fact it all just comes down to a sentence or two?

You ask what the purpose of public engagement is. Well for me, it's genuinely engaging the public in the decision-making conversation. You can't do that by reading a one-page summary of what they said.

An *I'm a Scientist* participant once told me the reason he loved taking part was the efficiency. He could log in any time, from wherever, and start typing. No travel, no rehearsals, no preparing a powerpoint. Every minute he spent was time spent engaging with young people.

That efficiency means maybe online is our best chance of actually getting policy makers to join in the conversation and make engagement the genuinely two-way process it should be.

Regards,
Sophia

Dr Patrick Middleton is head of public engagement at the Biotechnology and Biological Sciences Research Council
patrick.middleton@bbsrc.ac.uk

Sophia Collins is a Producer at Gallomanor Communications Ltd
sophia@gallomanor.com

After Fukushima

We need a democratic debate, argue **Alister Scott** and **Jim Watson**

Japan's earthquake and the subsequent devastating tsunami are extraordinary events by any standard. The evacuation of thousands from the danger zone around the stricken Fukushima nuclear plants, and the difficulties caused by power black-outs give us a text-book case of how human choices and technology can increase our vulnerability through unintended side effects.

It is too early to say precisely what has gone wrong. Brave operators are still battling to control the situation, at a time when many of them must be facing personal loss as a result of the tsunami.

For the rest of us, we need to be thinking about the implications for how we collectively make decisions about the future use of nuclear power. Both blandishment and outright rejection have been hasty and unhelpful.

Need for measured critiques

Such incidents are often made worse by the ways in which the industry and governments handle them. This can be seen in the early stages of this disaster with officials, nuclear industry representatives and even supposedly independent commentators telling us that all is fine. But as things get worse, people wonder why early reassurances were issued when there was clearly no basis for them.

What officials and politicians seem not to understand is that most people accept that they will only ever have a rough understanding of the facts. Instead, people instinctively ask themselves, 'Can I trust those who are in charge here?' In this connection, strong government support for nuclear power can raise suspicions about the close relationship between government and the industry.

What are the implications? First, industry and governments need to be more straightforward with the public. Statements that imply full knowledge when the situation at Fukushima is far from resolved are deeply unscientific; a more humble approach where officials are frank about the unknowns would paradoxically engender greater trust. Nuclear's opponents also need to adopt a measured approach in their critiques.

We need a fuller democratic debate about the choices we are making about technology. Catastrophic potential needs to be a central criterion in decisions about technology. Advice from technical experts is useful, but some of the most significant questions are ethical in character.

UK debate

With respect to the UK, our research has highlighted that political debate on energy security has often been simplistic, narrow and closed. policy makers have rushed to embrace nuclear power as the answer to energy security and climate change. This was perhaps most famously the case when the then Prime Minister Tony Blair pre-empted the conclusions of a consultation about energy options, publicly telling the nation that nuclear power was back 'with a vengeance'. Contrary to such definitive statements, our research has shown that new nuclear has mixed implications for UK energy security.[1]

What officials and politicians seem not to understand is that most people accept that they will only ever have a rough understanding of the facts

Similarly, those firms and investors who have become involved in nuclear have often failed to take regulatory and political risk into account. History shows that nuclear accidents can lead to tighter regulations, which in turn increase nuclear costs.

Further ahead, the proponents of hazardous technologies need to bear the full costs of their products, including insurance liabilities and the cost of independent monitoring of their environmental and health effects. As it stands at the moment, taxpayers would bear the costs of any future nuclear incident, and environmental monitoring of hazardous products is patchy.

Critics of technology are often dubbed in policy circles as anti-science. Yet critical thinking is a central element of any rational decision-making process. It is ironically less scientific to support a particular technology in an uncritical way. Democratic debate about our choices over technology needs respectfully to embrace the full range of views, treating them as useful sources of intelligence. Quiet voices sometimes bring wisdom.

1 Jim Watson and Alister Scott (2009): New nuclear power in the UK: A strategy for energy security? *Energy Policy* vol. 37 pages 5094 - 5104

Dr Alister Scott is a Visiting Fellow at the Science Policy Research Unit at the University of Sussex **scott.alister@gmail.com; Twitter: @alisterscottuk.**

Professor Jim Watson is Director of the Sussex Energy Group at the University of Sussex **w.j.watson@sussex.ac.uk**

The crucial one-fifth of a second

Tim Radford on public engagement and science journalism

Here is a paradox: journalists and broadcasters have a role in public engagement with science, but only if they don't give it a thought. There are several reasons. A journalist must maintain detachment, even from notionally good causes such as public engagement. Public engagement is a generalisation, and journalists, like readers and listeners, prefer the particular rather than the general. But the most urgent reason is that journalists write a story with only one thing in mind: how to make somebody read it.

Keeping the contract

But this is exactly where questions of public engagement begin. Are we writing about archaeological discovery, global warming or precision measurement of Himalayan altitudes? Does the public know about ground-penetrating radar, albedo or isostasy? Are we going to use those words at all? The last two are relatively 'old' science (they date from 1859 and 1914, according to the second edition of the *OED*) and the first phrase is relatively new technology. If we do use these terms, with extra explanation, will we then also use others such as radioisotope dating, methane hydrates or orogeny? The answer is: not if we can help it.

One needlessly incomprehensible word is all it takes to break the silent contract between writer and reader. As I am fond of pointing out, it can take a scientist several years to establish a conclusion – about, perhaps, cancer genetics – and several months to get it published. It can take a reporter many hours to read the research, talk to the scientist, and then write the piece. The next morning, the reader gets as far as the word 'allele' and stops reading in just one-fifth of a second.

On our own terms

But if journalists don't use such words, how will lay people ever know them? The answer is straightforward: our business is telling stories. We have a responsibility to democracy to tell people things that may be important to them. But we tell these stories on our terms, and we are free to choose the words. Readers are not obliged to master the jargon of science, but they are entitled to learn of its discoveries.

I make a distinction here between science bloggers and journalists in what remains of the traditional mass media. Science bloggers can fairly assume that their audience has logged on to read about science. Newspaper readers buy the paper for news: any news. So the challenge for any mass media science writer is to make the science story as compelling or provoking as a story from the world of sport, politics or economics. This should not be difficult.

New words for new discoveries

I am also fond of pointing out that, unlike most reporters, the science correspondent has the opportunity to write something that has never been written before, and very occasionally something that no-one could ever have imagined writing before. With that privilege goes responsibility. New discoveries require new words. According to something I read in *Nature* two years ago, biology alone has added 60,000 new words to the Oxford English Dictionary.[1] The entire Avon catalogue of Shakespeare is composed in about 30,000 words. So reporting also becomes an exercise in translation: new terms are introduced cautiously, and with a simple glossary.

It can take a reporter many hours to read the research, talk to the scientist, and then write the piece. The next morning, the reader gets as far as the word 'allele' and stops reading in just one-fifth of a second

For most of my science reporting life, whenever science reporters used the acronym DNA, they would add 'the four-letter alphabet of life, encoded in the nucleus of almost every living cell' or some such variation. And then, some time this century, we stopped doing so. DNA had entered the vernacular. The public had become a little more aware. Without planning to do so, we achieved engagement. Big deal: it only took 25 years.

1 www.nature.com/nature/journal/v458/n7241/full/458972a.html

Tim Radford was science editor of the *Guardian* until 2005. His geographical memoir *The Address Book: Our Place in the Scheme of Things*, is published by Fourth Estate

radford.tim@gmail.com

Scientists and animal experimentation

Scientists are increasingly being required to engage with the public. This is an unwelcome message to many who use animals in research. Frances Balkwill and Sophie Petit-Zeman reflect.

Scientists should be open about animal research

They need to dispel misconceptions, argues **Frances Balkwill**

The booklet *Where do Medicines Come From?* is now available in doctors' waiting rooms and pharmacies throughout the UK.[1] Developed by Understanding Animal Research, with support from the Wellcome Trust, it shows how medicines are developed, and the central role played by animals.

Health directly affects us all, and this booklet will reach the many people who rely, in one way or another, on medicines. Most who read it will be unaware of the 12-15 years needed to develop a new medicine, and that animals are an essential part of this. Opening the eyes of the public to the truth might be seen as bold by some, but there is no evidence of a backlash arising from such communications; on the contrary, they can help build a more supportive environment.

Below the radar

We live in very different times to those of a decade ago, when animal rights extremism was at its height and researchers feared discussing their work publicly. The main extremists are now in jail and their long sentences should deter others from following a similar course.

Meanwhile, public support for medical research and the benefits it brings is high. Despite this benign environment, many in the scientific community still fear public hostility.

Scientists, their supporting staff and managers still remember the stories of harassment and intimidation. Many prefer to keep 'below the radar' rather than risk their safety or reputation. But activists ideologically opposed to animal experimentation already know which scientists use animals; peer-reviewed papers and conference presentations are monitored by campaign groups.

Keeping silent means closing the door to genuine public discussion. We all benefit from scientific advances, and most of us are supportive of well-planned, humane research. We should all have the opportunity to understand why animals are used and how well they are cared for.

Value of openness

Scientists do not need to advocate or advertise their use of animals, and openness does not necessarily mean high profile media campaigns. Many institutions already have website position statements on animal research, present animal studies in press releases, and host visits to their animal facilities. Institutional commitment to these public engagement practices is key to breaking down barriers and changing perceptions.

Communication of research issues allows people across society to connect with science and technology. It may not always lead to public support, but it does build trust and confidence, which can never be achieved without this transparency. Research funders now require that public engagement forms a key aspect of scientists' work, and this provides opportunities to communicate on all issues. Scientists are often surprised that open discussion of animal research is met with interest, and the negative reactions they anticipated are rare.

Openness might not be for everyone. There are still a few organisations and individuals who have good reason to believe that engagement is risky. But communication by the scientific community is the only way to ensure that the agenda for discussion of animal research is not set by those who oppose it. As *Nature* said recently, 'There is no excuse for institutions that house animal research – including most research universities – not to have vigorous and well-defined programmes to explain what goes on within their walls.'[2]

Since 2006, Understanding Animal Research has been helping research organisations develop strategies for communicating animal research. These include advice and resources for researchers and support staff, and a successful school speaker programme involving hundreds of researchers throughout the UK. We have seen greater transparency give rise to greater understanding and the development of public trust. Talking about how and why we use animals in research is the only way that the misconceptions can be dispelled.

1 See **www.understandinganimalresearch.org.uk/page/download_document/?document_id=77**

2 *Nature* (2011) Animal rights and wrongs, 470 435 doi:10.1038/470435a **http://www.nature.com/nature/journal/v470/n7335/full/470435a.html**

Professor Frances Balkwill, OBE FMedSci,
is Chair, Understanding Animal Research
f.balkwill@qmul.ac.uk

Researchers' low profiles have been understandable

But **Sophie Petit-Zeman** points towards support

The 2010 Ipsos MORI report on public attitudes towards animal experimentation reveals, overall, an ongoing high level of acceptance.[1] While such a climate might be expected to encourage animal researchers to speak out about their work, the reluctance of some to do so has been understandable.

Violent history

In June 1990, two veterinary surgeons involved in animal research had their cars blown up. The event marked a disturbing increase in violence used by the Animal Liberation Front (ALF).

In 1999 an estimated 1,200 animal rights extremist attacks caused terror to victims and at least £2.6m of damage to property. Much of this was carried out by ALF's balaclava-clad henchmen against universities and companies, while ALF's militant splinter group, The Justice Department, targeted vets, researchers and business people. Stop Huntingdon Animal Cruelty (SHAC), set up in 1999, SPEAC (Stop Primate Experiments At Cambridge) and SPEAK, which focuses its ire on Oxford University, are the main groups active today.

Although by 2009 police estimated that up to three quarters of the most violent activists were behind bars, it is easy to see why their reign of terror made its mark on the research community and others involved with it such as building contractors and banks. The ALF's founder, solicitor's clerk Ronnie Lee, said, 'If I heard that an animal abuser was hurt in violence, I would not be sorry.'

The efficiency with which his group and others did this led many researchers to keep quiet.

Support for researchers

But with a growing emphasis across all research sectors on the importance of public engagement,[2] silent scientists who may have simply felt too busy with the day job may now feel encouraged to talk about what they do. For the nervous animal researcher, this may only happen if they feel sufficiently reassured by the outcomes of tight policing and the work of groups such as Support4RS, which provides advice and support about extremism to individuals and organisations using animals in research.[3]

There is no lack of support and training for those willing to speak on this topic, from organisations including my own, to Understanding Animal Research and the Science Media Centre. Perhaps surprisingly, some scientists seem more willing to speak in schools about animal research than to adult audiences. As Professor Max Headley, one of those attacked in Bristol said, 'With adult audiences you can't guard against vigorous heckling and abusive language disturbing considered discussion; that doesn't happen with kids.'

The Spartacus moment

Those who hesitate to talk about what they do could take heart from Professor John Martin, a clinician and researcher at University College London. Helping to launch the 'People's Petition' in 2006, which sought public signatories for statements supporting medical research and called for scientists to be allowed to carry out their work without fear of intimidation or attack, he said, 'If you remember the film Spartacus, when the Romans said "Stand up, Spartacus!", all his mates stood up. If we all do that, there will be no target and the threat will disappear.'

Twice that same year, two Pro-test marches organised in Oxford by 16-year old Laurie Pycroft saw hundreds of scientists and others stand up for responsible animal research. At the first of these, neurophysiologist John Stein, who has faced particular anger through his work with primates, declared: 'This is an historic day. We have drawn a line in the sand.'

Five years on, we can perhaps hope for fewer Spartacus moments and historic days, and a growing acceptance of responsible, well regulated and thoughtful animal research as just one of many techniques used by researchers for patient benefit.

1 See **http://tinyurl.com/3hhav8s**

2 See, for example, last year's Research Councils UK *Concordat for Engaging the Public with Research*, **www.rcuk.ac.uk/per/Pages/Concordat.aspx**

3 See **http://support4rs.com/**

Dr Sophie Petit-Zeman is Adviser, Public Involvement & Engagement at the Association of Medical Research Charities

s.petit-zeman@amrc.org.uk

Engaging on climate change

Members of the public can experiment with their own energy mixes for the UK, using a web tool launched by the Department for Energy and Climate Change. David Mackay explains how it works, while Nicola Frost asks whether the associated online debate makes for valuable engagement.

My2050

David Mackay brings evidence to life

The UK is committed to reducing greenhouse gas emissions by 80 per cent by 2050. A range of technologies and lifestyle-change options is available, to transform how much energy we use, and where we get it from. And we need to select from those options a combination that adds up – a combination that delivers a lifestyle that makes us happy, using energy sources that are sustainable.

The transformation required is so big, there is no one technology that can solve the challenge. And every option, be it wind, nuclear, biofuels, solar power, hydroelectricity, building insulation, smart thermostats, public transport, car clubs, rail freight, or smarter food choices, has both supporters and critics.

Evidence-based debate

At the Department of Energy and Climate Change, we are keen to move the public debate about these options on to a constructive, evidence-based conversation. This conversation needs to encompass the full picture, so people understand which lifestyle choices drive our energy consumption; and it needs to be grounded in reality, constrained by the laws of physics and the technical limits of engineering and innovation.

We set ourselves the challenge of communicating all this information transparently and fairly, in a way that is engaging and intelligible, particularly for younger audiences who will live with many of the decisions we make today.

Choosing the future

Our solution, My2050, is an online simulator that transports users to the UK in 2050. When they arrive, they find nothing has been done to reduce fossil fuel use, and it's up to them to choose combinations of demand-side options and supply-side options to reduce emissions, and still keep the lights on. At their disposal are fourteen levers across the energy system.

For example, you can insulate houses; use more public transport and bikes; switch to electric vehicles; build wind turbines on and offshore; even deploy emerging technologies like carbon capture and storage. In all sectors you can choose the level of effort, all the way from doing nothing to all-out action.

To make the experience engaging, My2050 tells the story visually. In response to your choices, wind farms and power plants pop up, and buildings, traffic and infrastructure are transformed. Alongside these visualizations of your house, your town, and your countryside, My2050 contains embedded summaries that explain key options and technologies, their strengths and limits. And this isn't just a computer game – it's all based on real UK data. My2050 shares the same underlying analysis as its big brother, DECC's 2050 Pathways Calculator.

Deliberative element

The combination of fun visuals and open, honest analysis makes My2050 a uniquely powerful engagement tool that brings the data and the science to life in a way that helps people understand the choices, implications and tradeoffs involved, and make a meaningful contribution to the debate. It also lets users think more widely about their preferences and prejudices, especially as they realise action is needed across several sectors. Are your views about wind, nuclear, and agriculture connected to your views about transport and heating? They should be!

We've worked hard to make this a deliberative experience. My2050 prompts reflection by giving direct feedback on users' choices and their implications. Users may refine their preferences, and once they are happy they can submit and compare their choices with those of others.

My2050 is a great example of how evidence can be communicated engagingly without compromising the quality of the analysis – even for such a broad area as energy and climate change. We launched My2050 in March, and so far over 60,000 people have logged on and 11,000 have had a go at creating their own low carbon UK. Try it yourself at **www.decc.gov.uk/2050**

Professor David Mackay is chief scientific adviser to the Department of Energy and Climate Change
david.mackay@decc.gsi.gov.uk

Effective public engagement?

Nicola Frost doesn't think so

To coincide with the launch of My2050, an online game that lets the player make virtual decisions about the UK's energy future, the Department of Energy and Climate Change (DECC) recently hosted an online debate: the pathways debate. It aimed to stimulate discussion on how the UK can reduce its greenhouse gas emissions to 80 per cent of 1990 levels by 2050. But was this a successful public engagement exercise, or did it just make people switch off?

As a focus for the Pathways Debate, eight experts were each asked to use DECC's My2050 web tool to illustrate the actions they believe the UK should take to sufficiently reduce its emissions. After presenting their pathways, and arguing their relative merits and problems, the debate was opened up for public contribution.

Specialist knowledge

Whilst about 11,000 people have already played the My2050 game, participation in the debate turned out to be rather lacklustre in comparison. Of the 168 posts made during the debate, 110 were made by a public consisting of just 51 individuals.

Perhaps a lack of publicity was partly to blame, but more likely was the existing specialist knowledge and associated confidence that appeared to be an implicit prerequisite for getting involved. A basic internet search of a few public contributors' names revealed sustainable technology engineers, oil and energy professionals and climate change campaigners, amongst others. Combined with the experts, this resulted in something akin to a round table discussion at an industry event, so it's not surprising that the My2050 game, with its jargon-free language, colourful graphics and easy-to-use format, has proved more appealing to the public.

Poor structure

Problems with the online structure of the debate added a further barrier to participation. With such a huge range of discussion topics sparked by My2050, some logical order and sub-structure would have been welcome.

For example, if somebody had a specific interest in nuclear power, a tag and search system to help guide them to relevant postings would have been helpful. Instead, the debate appeared as one long prose, which had to be read from the bottom up, covering a multitude of issues and conflicting opinions. Some technical problems, such as posts taking a long time to appear, or appearing out of place, only added to the confusion.

Intelligent discussion

Despite these problems, those who did take part applauded the debate for its intelligent, thought-provoking and technically advanced level of discussion that lead some of the experts to reconsider their pathways.

Debating how the UK should act to reduce its emissions is a healthy and necessary part of the important decision-making process, which the government has committed to making as transparent as possible. As a public engagement exercise, however, the debate issues were too broad, the assumed level of knowledge too high, the content too technical and the format too confusing to connect with a wider audience.

Finding the balance

Climate change public engagement initiatives are notoriously difficult to get right. On the one hand, leading people to believe that they can do their bit by recycling their plastic bags is underplaying the bigger issue, whilst TV adverts depicting an apocalyptic future world blighted by climate change do nothing more than scaremonger. Communicating the complexities that come with a low carbon future is no easy feat.

Whilst the My2050 game may have succeeded in striking this balance, the majority of the public are not ready to participate in expert debates, and will not only switch off from doing so but potentially adopt a dangerous 'ignorance is bliss' attitude that could make future engagement attempts even harder.

Nicola Frost is a postgraduate science communication student at the University of the West of England

nicola2.frost@live.uwe.ac.uk

Are women changing science?

Emphasise similarities

Uta Frith resists bias

I am not sure, but I would rather say 'no'. This is because I would find it hugely liberating if we could forget about gender when talking about careers in science. Instead, let's consider the question: Is science changing attitudes to women?

My answer here is a cautiously optimistic 'yes'. Science is a phenomenon that can shape attitudes and beliefs as strongly as religion and political ideologies do. We rightly depend on science to free us from our superstitions, and to point out the fallacy of many fondly held beliefs. Gender stereotypes are a case in point. I believe that science can challenge and, eventually, perhaps even abolish them.

But strangely, at present many scientists, men and women, seem to be only aiding and abetting them. This is understandable: there is a social advantage to categorising each other into kinds of people, because it allows you to know instantly where your place is in society, and to whom you are affiliated. But we cannot only pigeonhole people. If we forget that we are also individuals, we remain prisoners of prejudice.

Tempting stereotypes

Prejudice is bad from most points of view, but it gives you a tempting short-cut which allows you to avoid thinking deeply. So when I am asked the question 'Are women changing science?' my laid-back mind instantly serves up the common belief that, compared to men, women have more empathy, are more modest, more talkative and less competitive. A quick answer would let these common beliefs take over, especially if they make a nice story that makes women look oh so cooperative. But writing this, I can afford the time to reflect. I can ask whether these beliefs are true and hypothesise that they are simply a bias that systematically distorts the truth.

Following normal scientific practice, I have decided to go against this particular bias. I am taking delight in constantly finding men who are more emotional, gossipy, and spatially challenged than many women I know, and who hate to be confrontational. I can also find the converse. For instance, I know about myself that I am much less empathic and much more aggressive than I ever let on.

Stereotypes are very powerful and make us conform to them. But we can see through them and science can help us do so. I propose that we should emphasise similarities between male and female scientists far more than differences.

Uta Frith is Emeritus Professor at the Institute of Cognitive Neuroscience, University College London

u.frith@ucl.ac.uk

How I learned to love the human resources department

Mary Collins sees the value of rules

Academics hate rules; they particularly hate rules written by other people. So I was very resistant, when I was a new research team leader, to any kind of instructions about how to recruit PhD students or post-docs.

A letter came from the human resources department saying that I would have to attend an interview training course. After the intense embarrassment of watching myself on video, I realised that my own insecurity meant I spent the whole interview talking, in an attempt to persuade the person to come. Take home message: don't be afraid of asking the interviewee to explain any answer you don't understand. It works in seminars too.

Ten years later I was head of a small university department. The human resources department arranged training for the annual promotion process from Lecturer to Senior Lecturer to Reader to Professor. I thought this was totally pointless. I was managing fewer than ten academic staff and only one of them had asked to be promoted. Another revelation: you need to look at the CVs of all staff at each grade and think who is ready for promotion. Self selection favours the confident with time to pursue negotiations.

Small changes, big effects

Now I'm excited to be working with UCL's human resources department, and Baroness Warwick, a member of UCL Council, as UCL's Gender Equality Champion. We are aiming for small changes with big effects. The first one is 'core business in core hours'. We would like all essential meetings to be held between 9am and 5pm, maybe even between 10am and 4pm. This should help everyone plan their life: parents, party goers, athletes or those who are just bad in the morning, like me. Another job is to assess the impact of the introduction of student fees and various bursary proposals on the gender balance of UCL's student applications and intake. This is complicated, probably impossible to predict, but interesting.

Scientific research is a spontaneous and creative process, which requires individual talent, and does not follow rules. However, I do think that people engaged in research need fair treatment as employees and also training in how to be fair and effective managers. There, I'm talking like a member of the human resources department.

Professor Mary Collins is Dean of the Faculty of Life Sciences at University College London

mary.collins@ucl.ac.uk

Stress the positive

Carol Robinson shuns depressing tales

If the face of science is changing, and we would all like to believe that it is, why is it taking so long? It is now 100 years since Marie Curie won her second Nobel Prize in chemistry. As a mother of two children, and a largely self-taught chemist, I might have expected this eminent role model to inspire women to take up academic research. Why is this not the case?

In recent years, initiatives have been introduced to highlight women scientists. I confess however that I am always a little disappointed when the associated press releases, even in the 21st century, headline with such titles as 'Mother wins prize' or 'Woman wins top science prize'. Only when such awards are announced headlining the science behind the award will we know that gender is no longer the issue.

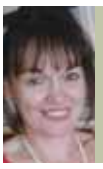
But I would still like to think that we are changing the face of science. My research team in chemistryis at least half women, many of whom go on to academic positions. It's not just that women work and think differently to men, but they are also often highly collaborative, making lasting friendships that extend beyond the duration of the project. Since these elements should and do contribute to a successful research atmosphere, how do we achieve this more widely? The biggest challenge remains in trying to persuade women to stay on at higher levels.

Pick out the perks

Numbers at the top need to increase. This cannot be achieved by women in these positions recounting tales of demoralization, poor rewards and unrelenting competition. We need to stress the enormous benefits of a career in science.

For me, these include the academic and personal freedom that come from being able to work the hours I choose on the projects that I find both fascinating and totally engrossing. When coupled with the academic family that I have nurtured throughout my scientific career, the opportunity to travel the world and present at international conferences, and the many close friendships I have formed, I can paint a very rosy picture.

These very positive aspects of a career in science need to be more widely appreciated. Then I believe women will be drawn to academic research and will populate science at all levels. Women will then have changed the face of science, not just for the benefit of future women, but hopefully for all.



Professor Carol V Robinson is Royal Society Professor in the Department of Chemistry at the University of Oxford

carol.robinson@chem.ox.ac.uk

Scientific trials and community engagement

Anthony James teases out a way forward

I am asked constantly whether or not it is really necessary to do community engagement. Furthermore, I have heard that community engagement is just a masquerade for public relations. After my recent experience with mosquitoes, here are my reflections.

Mosquito trials

Last November, an announcement by a British-owned private company and its collaborators that they had conducted open-release trials of genetically-modified mosquitoes in the Cayman Islands and Malaysia stirred up much debate in the public press and research community. The mosquitoes carry genes designed to suppress the target population, in this case, members of the species *Aedes aegypti*. These are responsible for transmitting dengue fever in many subtropical and tropical environs, and are associated historically with yellow fever epidemics. Modified mosquitoes are proposed as supplements or alternatives to insecticides or land-management practices, both of which are potentially harmful to the environment and anyway do not work all that well in controlling dengue fever.

As yet, the industry has no common standards in place to guide public and private development of these technologies. However, it is important for the public to know that the scientists involved are energetically helping to draw up standards so that the technologies will be applied and regulated safely, efficiently and ethically.[1]

Defining the community

Consent to field trials is not only a matter for the designated governmental authorities in the countries in which they take place. If the technologies are going to be accepted as public health tools, it is essential that the larger community participates, discusses and ultimately authorises their use. It is difficult to define and identify those who have a legitimate stake in the trials, but my colleagues and I adopted a working definition that the community consists at a minimum of those individuals 'who share identified risks associated with the proposed research project.'[2] We recognised that the community is not a pre-existing and established structure, but forms as a result of the project.

Community engagement activities are essential. These identify all who must be made aware of the proposed trials, and we argue that the community must also be able to provide input. These activities should be initiated early in the project to avoid pressuring communities to make quick, and perhaps unsound, decisions based solely on meeting timelines. A stepwise approach is valuable, with specific decision points for moving ahead to help provide ample time and opportunity for evaluation.

Vital issues

The purpose and goals of the research must be made clear to allow the community to decide whether its support and participation are needed. Trust is vital in any such project, and as in all human ventures, it takes time to develop but can be lost quickly. Communities must trust that their interests are not treated as less important than the new technology.

We need to balance the promotion of potentially valuable health practices with community prejudices. This is a significant challenge. There also is much debate about whether community- and regional-level studies should be subject to informed consent in the same way as individual participants in research. It helps to choose research sites where there are already mechanisms for obtaining the community's authorisation.

Trust is vital in any such project, and as in all human ventures, it takes time to develop but can be lost quickly

Community engagement is a complex social phenomenon. As such, all activities must be reviewed and evaluated constantly during the project, and modified if necessary.

Engagement and PR

If we really believe that genetically-modified mosquitoes will help alleviate disease (and we do), why put at risk their future adoption by not engaging those for whom they were designed? Scientists are accused constantly of communicating poorly with the public. What starts out as community engagement and a search for the 'right thing' to do may end as good public relations after all.

1 WHO/TDR (2010), Progress and prospects for the use of genetically-modified mosquitoes to inhibit disease transmission. Report on planning meeting 1: Technical consultation on current status and planning for future development of genetically-modified mosquitoes for malaria and dengue control. WHO/TDR publications ISBN: 978 92 4 159923 8 DOI: 10.2471/TDR.10.978-924-1599238.

2 Lavery *et al.* (2010), Trends in Parasitology 26, 279-283.

Dr Anthony A. James is Distinguished Professor in the Department of Microbiology & Molecular Genetics at the University of California, Irvine

aajames@uci.edu

Quakes and quacks

Michael Edmonds reflects on science and pseudoscience

At 4.35 am on 4 September 2010, a 7.1 magnitude earthquake struck Christchurch, New Zealand. The experience of being shaken out of bed and sheltering under my bedroom doorway as the house around me felt as though it was ready to come apart, will be etched into my memory forever.

The quake lasted for forty very long seconds. However, despite its intensity, Christchurch emerged with only limited damage. There was no direct loss of life and many buildings sustained only mild damage: cracked walls, collapsed chimneys, fallen parapets. The quake left Christchurch, New Zealand's second largest city, with mild infrastructural damage.

Curious to understand what had happened, Christchurch residents turned to local geologist, Dr Mark Quigley and his colleagues, who provided the media with explanations of earthquake science. Geologists attained an almost rock star drawing power, with public lectures on the earthquake filled to overflowing.

Geologists attained an almost rock star drawing power, with public lectures on the earthquake filled to overflowing

Although the earthquake was accompanied by thousands of aftershocks, these gradually diminished with time, and life in Christchurch returned to relative normality. Or so we thought.

The big shock

On 22 February, at 12.51 pm, a 6.3 magnitude earthquake hit Christchurch. In spite of its lower magnitude, the unusual dynamics of the quake (later described by geologists as the 'trampoline effect') caused significant damage and loss of life.

This time whole buildings collapsed, the iconic Cathedral lost its spire, and the central city was evacuated and cordoned off for weeks. 182 people were killed. The city's infrastructure – power, water, and sewage systems – failed, and liquefaction appeared citywide, with thousands of tonnes of silt surfacing and deforming many of the road surfaces. Telecommunication networks overloaded, making it impossible to check up on family and friends.

Need to understand

The death toll and damage produced a fundamental shift in public interest. Curiosity about quake geology was replaced by a need to understand why certain buildings collapsed. The inability of science to predict earthquakes led some people to look to pseudo-science for answers.

Retrospective claims by 'moon man' Ken Ring that he had predicted the quakes based on the position of the moon, and that a further event, 'one for the history books', would occur on 20 March, polarised Christchurch. Community leaders and scientists denounced Mr Ring's comments as scaremongering. Debate over these predictions raged in the media in the weeks prior to 20 March, and nearer to the date whole families chose to leave Christchurch, 'just in case'.

Local skeptics and scientists defied Mr Ring's prediction and organised a lunch at the Sign of the Kiwi, Christchurch's highest stone building on the fateful day. As expected, 20 March remained quite uneventful. Mr Ring has since faded into the background.

Challenges for communicators

The furore over Mr Ring's 'predictions' highlights some of the challenges faced by science communicators in the wake of natural disasters. How do we reassure the public when science seldom provides the type of absolute answers that would perhaps comfort them?

I think Mark Quigley demonstrated some excellent skills in this respect, providing clear, friendly explanations using simple models and visuals. Young, good looking and often dressed casually, he provided the public with an image of scientists that is easy to relate to: sympathetic and involved.[1]

At the time of writing, six weeks after the quake, the city still looks like a wreck. Unsafe buildings have been demolished, leaving whole blocks of barren land. The infrastructure is barely functional in terms of water, power, and sewage. But the people of Christchurch are now looking to the future, focusing on rebuilding the city. Science will play a role in this, helping decide where, how and what we build to ensure a safer, greener and better future for Christchurch.

1 An interview with Mark Quigley can be found at www.3news.co.nz/Ken-Rings-quake-theories--how-scientific-are-they/tabid/367/articleID/202629/Default.aspx

Dr Michael Edmonds is a lecturer, researcher and programme manager at Christchurch Polytechnic Institute of Technology in New Zealand. Trained as a chemist, Michael has developed an interest in science communication and writes the Molecular Matters blog at **http://sciblogs.co.nz/molecular-matters/**

Explaining statistics

Andrew Garratt describes a new campaign

About 200 years ago, William Curtis MP coined the phrase 'the three Rs'. His view that reading, writing and arithmetic are necessary skills has stood the test of time. The Royal Statistical Society (RSS) now aims to add a fourth 'R', Statistical Reasoning, through its newly-launched ten-year statistical literacy 'getstats' campaign.

Statistical Reasoning is the ability to interpret, evaluate, apply and communicate statistical information. 'Employers cite gaps in the numeracy and problem-solving skills held by school leavers, graduates and their current staff,' says RSS executive director, Martin Dougherty. 'School teachers describe a lack of confidence in their ability to teach statistical skills effectively. Journalists report a similar lack of understanding and confidence when using data.'

Bacon sandwiches

The campaign builds on well-established RSS activities, such as its workshops for journalists that both explain basic statistical principles and provide insight into how to question statistics-based claims more effectively.

The need for the workshops is shown by how health-related stories are reported. For example, on 1 November 2007, the *Sun*, along with many media, reported a major study that estimated a 20 per cent increased relative risk of bowel cancer from eating 50g of processed meat every day, ('Careless pork costs lives' was its classic sub-headline). Although such issues are not necessarily wrongly reported, the RSS aims to help journalists report in ways that are less alarming or confusing to the public by explaining the difference between relative and absolute risk. The absolute risk of getting bowel cancer is 5 per cent. Eating bacon raises this to 6 per cent.

Professional users

Through its Statistics User Forum, chaired by economist and broadcaster Andrew Dilnot, the RSS promotes engagement among the great diversity of professional users of statistics, and the bodies that produce them.

At its most recent conference the relevance and quality of the UK's economic and social statistics, particularly with regard to the recession, were scrutinised by health and crime statistics users, asset managers, economists, and local government officials. They heard from speakers such as deputy governor of the Bank of England, Charlie Bean, who concluded that there were no 'obvious lacunae in our conventional macroeconomic indicators, though it has certainly presented us with plenty of puzzles.'

Students' analysis

Working with schools on ways of allowing students to learn about statistics through use of data from their own lives, is a key part of the campaign. Towards developing its 'Planet Earth' project, the RSS helped run workshops with 270 Key Stage 3 and 4 students from three schools.

Students interviewed their parents about, among other things, their use of transport and energy, what products they bought, and their attitudes to climate change and sustainability. Students then coded the data and submitted it for analysis in advance of a conference run by an RSS team in their school. The data was then incorporated into an event programme, in which students took part in quizzes, interactive presentations, and practical exercises in which they interpreted their own data.

Working with schools on ways of allowing students to learn about statistics through use of data from their own lives, is a key part of the campaign

Life skill

Through activities like these, the campaign aims to achieve three long-term objectives. First, we hope to close the gap between current levels of statistical knowledge and skills, and what is needed. Second, to create a new culture by altering beliefs around the role of statistics, both as data and as a discipline; and third, to reposition statistics so it is recognised and desired as a valuable life skill.

'We are confident our objectives are achievable. The data and tools are there for people to use and, we believe, so is the public interest,' concludes Martin Dougherty.

Andrew Garratt is the Royal Statistical Society's Press and Public Affairs Manager

a.garratt@rss.org.uk

Public participation – a loser's game?

Jesper Lassen, **Annika P. Nielsen** & **Peter Sandøe** expose the politicians

Some societal issues raised by science and technology are examined in participatory processes that engage the public as a whole. Yet other, apparently similar issues are handled with little public involvement. Looking at two specific issues, we tried to explain this contrast — to say why initiatives to involve the public were so much more energetic in one case than they were in the other. The issues were GM foods and functional foods.

Our study showed that politicians who decide whether or not to initiate public engagement are happy to acknowledge its value. However, in deciding whether or not to involve the public on any specific issue, democratic ideals are sacrificed to meet strategic concerns about what decisions serve the politicians best.

Enthusiasm in theory

Our conclusions are based on interviews with key members of the Danish parliament, about the ideal of public participation. We were interested specifically in the politicians' perceptions of the difference between GM foods, which have prompted many initiatives in public participation, and functional foods, which have not.

Across the political spectrum, the politicians we spoke to agreed that public participation is a good thing, especially when science and technology raise questions of ethics and values; when they touch upon broader societal problems or potential conflicts of outlook; when they bring about permanent change, or affect people's everyday lives.

The politicians saw that both GM foods and functional foods meet many of these criteria, and were therefore candidates for public consultation. However, it soon became clear that, when it comes to actually setting effective participatory processes in motion, they often give priority to a number of countervailing concerns.

Politics in practice

To begin with, an issue is invariably judged by its 'suitability for public debate', as one informant expressed it. Behind this expression lay a concern about the extent to which politicians would be able to control any unfolding debate. This concern was backed by the observation that the media are not interested in nuances, but rather seek out potential conflicts, thereby distorting the real debate.

Then there are anxieties about accusations of ulterior motives. Representatives of both the Conservative and the Liberal (right-centre) parties worried that, while they may be seen as positive on functional foods, they would run the risk of being depicted, by the media and opposing parties, as mere errand boys for the food industry.

A rather different concern related to the division of work between policy processes at EU level and in the Danish parliament, and the need to get the timing of participatory processes right. For example, at the very moment the EU was preparing legislation on functional foods, the time was not considered 'ripe' for public engagement on that issue in Denmark. So by the time the Danish political establishment was ready to engage with functional foods, decisions on the issue had already been made by the EU. The ship had sailed.

Concerns like these have conspired to ensure that the functional foods issue has never even been close to being taken up by public participatory processes in Denmark. As the Minister for Family and Consumer Affairs, Carina Christensen, candidly acknowledged when interviewed: 'This debate would be very relevant, it just so happens that it is a real loser's case. And that's not exactly something—especially not in an election year—that politicians will go out and start a debate on.'

With GM, on the other hand, politicians found it in their interests to engage the public because this issue was the subject of an intense and ongoing public debate. Thus GM foods caused social controversy, largely forcing the Danish politicians to engage the public.

This piece is a shorter version of A Nielsen, J Lassen and P Sandøe (2011), Public participation: democratic ideal or pragmatic tool? The cases of GM foods and functional foods. *Public Understanding of Science*, 20(2):163-178

Dr Annika Porsborg Nielsen is a consultant with Red Associates
annikapn@gmail.com

Dr Jesper Lassen is associate professor of sociology at the Institute for Food and Resource Economics, University of Copenhagen
jlas@foi.dk

Dr Peter Sandøe is Professor in Bioethics at the Institute for Food and Resource Economics, University of Copenhagen
pes@life.ku.dk

It's dark on Sark

Voluntary engagement won an award, says **Jo Birch**

SARK's night sky is dark – it's official. The Dark Sky Community award was granted by the IDA (International Dark Sky Association) in January 2011 to Sark in the Channel Islands. This small island, 5 x 3 km, lying about 20 miles from the Normandy coast, is now the first Dark Sky Island.

We take our lovely starlit skies for granted and have always located Orion and Polaris without difficulty. Our new status means no street lights, no tractor traffic (cars are prohibited anyway) after 10 pm and lots of hand torches. And, with a unit of electricity costing 50p, very few and very dim outside lights – usually on a timer. The idea is to not waste light, but to shine it where needed and not upwards or outwards.

Our desire to win Dark Sky status had to be voluntary. To convince the IDA that we recognized and valued our darkness and wanted to preserve it, that we cared about energy conservation and the natural world, meant engaging with the whole community. It was not simple.

More visitors

The main problem was convincing residents that it was worth trying for the award, that by adopting good lighting practices and demonstrating our commitment to dark skies, we could attract more visitors out of season.

The campaign was initiated by Felicity Belfield, a 90-year old amateur astronomer who noticed the *Guardian* listing the darkest places to enjoy the night skies. She promptly wrote to me as a fellow star-gazer. 'Sark isn't even mentioned,' she said, 'and we should be top of the list!' As a member of Sark's conservation/heritage group, I was able to take the project forward.

After consulting with Steve Owens, UK Co-ordinator for the International Year of Astronomy and our 'pilot' throughout the project, a letter explaining the project and its hoped-for benefits was sent to all households. The most common reaction was, 'We hardly ever turn our outside light on.' Sark Electricity Company (probably the last privately owned power station in Europe) was fortunately on board and so was our government (Chief Pleas). All external lighting was inspected, as overall we needed to be 75 per cent compliant to have a chance for the award. We had two problems; one was Flamanville (nuclear processing plant on the French coast) and the other the Mermaid disco lights, Tuesday nights. Neither was resolved but we have a plan for the Mermaid.

Lighting engineer James Paterson drew up a Lighting Management Plan. Both Steve and James spent a week over here; they talked to practically everybody, gave presentations, enthused and encouraged us to be dark-sky friendly. Steve ran an astronomy session in Felicity's garden and, since it was during the Icelandic volcanic ash period, the skies were particularly clear.

Information and support

Information on replacing non-compliant lighting was freely available island-wide, some necessary changes were made and fund raising instigated; we needed about £4,000. Chief Pleas was kept informed of progress throughout and the two astronomy presentations each attracted 50 of our 600 population. Sark Astronomy Society (SAstroS) was formed with 25 members plus two telescopes.

To convince the International Dark Sky Association that we recognized and valued our darkness and wanted to preserve it, that we cared about energy conservation and the natural world, meant engaging with the whole community

The quality of Sark's night sky was independently verified by three IDA inspectors and our application, together with letters of support from various island businesses, was submitted via the 10th IDA International Symposium in ungary in September 2010.

We are planning a weekend 'Star Festival' on 21 October. The University of Leicester plans to route an all-sky telescope through Sark School, so the older children can regularly download information about stars, weather and anything that moves through the sky.

The IDA will audit us again in 2021 so it's important that we maintain our current lack of light pollution and skyglow which enable us to see the stars and appreciate the night sky.

Jo Birch is a resident of Sark, Honorary Secretary of La Société Sercquaise and Head Gardener of La Seigneurie Gardens in Sark. She did the paperwork to get a Ramsar site recognition on Sark and is a committed conservationist.

jo.birch@cwgsy.net

Advisory Council on the Misuse of Drugs

Changes will bring improvement, asserts **James Brokenshire**

Imran Khan (March 2011 issue, p29) alleges that the government is set to confuse advice and governance. I disagree. The Advisory Council on the Misuse of Drugs (ACMD) plays a vital role providing advice to government in the complex area of drug policy.

A provision in the Police Reform and Social Responsibility Bill removes the statutory requirement for the Council to have members from six specified areas of expertise. However, we are not intending to remove any existing members from the ACMD, including scientists.

This change will provide flexibility for the future. It will allow the pattern of the ACMD's membership to be adapted in response to the many changes impacting on the drugs landscape. It will also place all its members on an equal footing, recognising the fact the ACMD includes members from the fields of treatment, law enforcement, public health and social policy.

The ACMD was consulted and was supportive of the changes, as was the wider science community. Those consulted included the Royal Society, the Academy of Medical Sciences, the British Academy, the British Society of Criminology, the Royal Pharmaceutical Society and the Royal Society of Medicine.

The government and the ACMD have jointly drafted a Working Protocol which makes clear that the views of the ACMD will be sought to inform recruitment and how recruitment, in line with the guidance of the Office of the Commissioner for Public Appointments, will be conducted. A final version of the Protocol will be published in due course. In the meantime, a Home Office fact sheet[1] provides a list of likely relevant expertise we have identified with the ACMD for its future membership.

This is first and foremost about better enabling the ACMD to fulfil its duty to provide informed, timely advice that will ultimately better protect our communities from drugs.

1 See **http://tinyurl.com/6ewx2hj**

James Brokenshire MP is Minister for Crime Prevention
brokenshirej@parliament.uk

Peer review

It's based on faith, replies **Richard Smith**

Tracey Brown (March 2011 issue, p27) makes the case for traditional peer review, but sadly she ignores the evidence—in an unscientific way. Ironically, peer review, a process at the heart of science, is faith-based, not evidence-based

As editor of the *BMJ*, I spent 25 years working with peer review. However, as studies have failed to show its effectiveness and evidence has accumulated of its many defects, I've turned against it. Plus I've recognised that the 'real peer review' is anyway what happens after publication Then the world decides which research matters and which doesn't.

A systematic review that examined all the evidence on the effectiveness of peer review concluded: 'At present, little empirical evidence is available to support the use of editorial peer review as a mechanism to ensure quality of biomedical research.'

Yet evidence of its downside is abundant. It is slow, expensive (costing some $1.9 billion a year, according to the Research Information Network), largely a lottery, poor at detecting error, prone to bias, anti-innovatory, easily abused, and unable to spot fraud. I've summarised the evidence behind all these statements in an article free to all.[1]

But let me give you the evidence on error. We took a 600-word paper, inserted eight errors, and sent it to 300 reviewers. Nobody spotted more than five errors, the median number spotted was two, and a fifth didn't spot any errors. The study has been repeated many times.

Before the internet we lived in a world in a slow and inefficient world of 'filter then publish.' Now it's 'publish then filter', and there are many good filtration mechanisms much superior to traditional peer review.

1 See **http://breast-cancer-research.com/content/12/S4/S13**.

Dr Richard Smith is Former editor of the *British Medical Journal* and board member of the Public Library of Science
richardswsmith@yahoo.co.uk

Enlightenment and hand-wringing

Alice Bell takes stock of public engagement

Janus Hansen (2010), *Biotechnology and Public Engagement in Europe* (Basingstoke: Palgrave Macmillan) ISBN: 9780230242128

Public engagement with science and technology (PEST) is, in many ways, a movement of hope. Reading early calls for PEST written in the later decades of the 20th century, there can be something of the manifesto about them, perhaps because of the ways in which they often critiqued other models for science in society too. Since then, we have seen a formalisation of the various ideas and ideals of PEST, even into forms of science policy systems. Many people have even started to think in terms of a narrative arch shifting from old-fashioned top-down, to greater and greater levels of dialogic depth, towards a sort of PEST enlightenment.

Janus Hansen's new book, *Biotechnology and Public Engagement in Europe*, is a study – and a summation of other studies – reflecting upon the growth of this movement. What is more, he aims to ask questions of what it can realistically achieve.

The discourse of public engagement

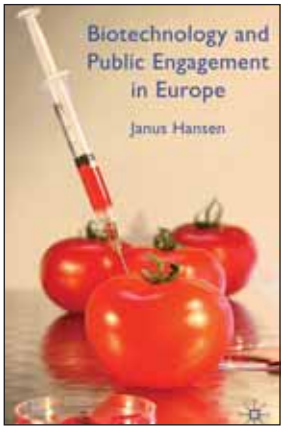
Hansen's book takes the social studies thesis model of extensive literature review, thematic analysis and conclusion. This has advantages for the general reader, as literature reviews provide an up-to-date and thoughtful synthesis of work on an issue. In particular, one of the introductory chapters on the 'discourse of public engagement' provides a useful run-through of work in this field.

As Hansen notes, talk about public engagement tends to reflect what should be, not is. To this discourse of publics, science and its governance, he tries to take the pragmatic attitude of a sociologist to consider how realistic the aims of such work actually are. He punctuates the simple hope with a bit of sociological pragmatism. The result is a mature approach to the ongoing diversity of cultures of engagement (and their challenges) across Europe, working up detailed case studies from Denmark, the UK and Germany, and noting different problems in each. Considering the field as a whole, he also notes that none of the three cases settled the controversy they considered. As I'm sure many engagement professionals will recognise, Hansen further stresses that engagement tended to happen at some distance to policy makers, and was often ignored by them.

Get convincing

In the end, I couldn't help but feel this was a very old story of academics failing to communicate effectively with people who aren't already their friends. By academics, I don't mean those in the natural sciences; I mean sociologists and geographers who sit at the centre of the principles of PEST. And so I wonder if the time for wordy sociology is over.

Much as I personally enjoy it, to be 'realistic' in practice, PEST needs to get out of those bubbles. Brian Wynne, Alan Irwin *et al* made the key points decades ago. If we truly believe the ideals of PEST, we need to get convincing. It's been neatly translated from sociology-speak in the Lords report and a great series of Demos pamphlets, but clearly that's not enough.

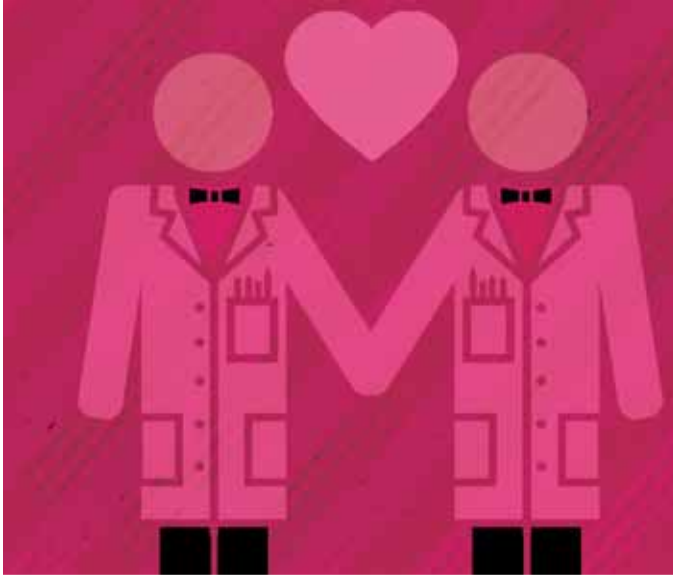


Get listening

Moreover, the advocates of PEST should practise what they preach, and get listening. They should be listening to those policy makers, scientists, industrialists and publics they hope to help connect through PEST work. Not only listening rhetorically, but really listening. To see why so many continue to misunderstand (sometimes wilfully misrepresent) the vision of PEST, disregard it, disagree with it, not notice it, or simply have their own ideas.

To end on a hopeful note: this is not an original argument. I know others see it too. 2010 was a year full of hand-wringing over how little had changed since the 2000 Lords report, let alone the 1985 Bodmer report. I for one am looking forward to the hand-wringing in 2031 (bicentenary of the founding of the British Science Association).

Dr Alice Bell is senior teaching fellow in science communication at Imperial College, London
alice.bell@imperial.ac.uk



What geeks can learn from gays

Mark Stevenson argues for intolerance

I've lost count of the number of times I've heard senior scientists lament the lack of appreciation for science in the general populace. 'If only people valued science we wouldn't have all these problems with…' and here you can fill any number of our current scientific *bête noirs* – climate change scepticism, the belief that homeopathy is any better than placebo, vaccine denial, and so on.

I sympathise with this point of view, which is why it makes my blood boil that some of those same senior scientists treat engagement with science either in the way Lindsay Lohan treats the highway code (as a rather troublesome bore) or pay it lip service, thinking the odd public lecture to the already interested somehow gets them off the hook.

It still amazes me that Carl Sagan was ridiculed by many of his peers who regarded his work in public engagement as something that devalued him - when the exact opposite was, of course, true. Richard Feynman suffered similarly from short-sighted colleagues.

Things have improved, though not enough. If I had a pound for every time in the last year I've heard Professor Brian Cox being lightly dusted down (out of his earshot) as 'not really a proper scientist', I could probably buy him quite a nice dinner.

I do, therefore I value?

Part of the problem is, I suspect, a widely held belief that you can only really appreciate, value (and therefore truly champion) science if you've put in some serious hours actually doing it or, at the very least, reading a lot about it – so the answer to getting the public on science's side is to have more of us take scientific subjects at school, and reading the weighty tomes of Roger Penrose and the like.

Really? Well I'm not gay, but I believe discrimination based on sexuality is abhorrent. I've done no 'gaying' in my life (unless you count toying with the idea of seeing Judas Priest in concert). My bookshelf has no volumes by Armistead Maupin, my DVD collection none of the films of Derek Jarman. I hate musical theatre. You don't have to be gay to care that society enshrines equal rights regardless of sexuality, and you don't have to do science to be concerned that our society is evidence-based.

So, perhaps we should ask ourselves: how did the gay community manage to get most people to care about something that, statistically, they have no personal investment in, while science is still battling to be valued by so many?

Science needs to fight

I'll tell you why. Because the gay community went out fighting, and science needs to do the same. Which is why, finally, it's so nice to hear the likes of Government Chief Scientific Adviser John Beddington saying, 'We are grossly intolerant, and properly so, of racism. We are grossly intolerant, and properly so, of people who [are] anti-homosexuality... We are not – and I genuinely think we should think about how we do this – grossly intolerant of pseudo-science, the building up of what purports to be science by the cherry-picking of the facts and the failure to use scientific evidence and the failure to use scientific method.'

So, perhaps we should ask ourselves: how did the gay community manage to get most people to care about something that, statistically, they have no personal investment in, while science is still battling to be valued by so many?

I'm heartened by the popularity of Ben Goldacre. I applaud Simon Singh's recent libel battle. Things are getting better, but it's taken far too long – and there's still a long way to go. We've got a lot of catching up to do.

Max Plank famously said 'Science advances one funeral at a time.' Let's make sure engagement with science doesn't carry on advancing at a similar pace. Particularly when we have a planet to save.

Mark Stevenson is a comedy writer, director of learning consultancy flowassociates.com and 'live science' communication agency **ReAgency.co.uk.** He is the author of *An Optimist's View of the Future* (Profile Books). You can follow Mark at **www.optimistontour.com** **mark_stevenson@btinternet.com**

'What did the Romans ever do for us?'

Phil Willis ponders an enduring question

The political debate in Parliament following any Budget Statement is always a little surreal, but talking to a group of former colleagues across the political divide about how science had fared reminded me of that wonderful Monty Python sketch: 'What did the Romans ever do for us?'

Wearing my most critical hat, I was pleasantly surprised just how well science, technology, engineering and maths (STEM) had fared. Some may wonder what lowering corporation tax to 23 per cent by 2015 would do for STEM. However, pharmaceuticals is one of the largest and most profitable sectors of the UK economy. It would be a prime beneficiary. Reducing tax on business profits below those of our main competitors, US, France and Germany, makes UK a more attractive place for research.

Equally the long-term fixing of the price for carbon at £16 per tonne by 2013 and £20 by 2020 gives investors in new green technologies greater certainty about their investments.

Economic recovery

But 'What did the Romans ever do for us?' is the cry from those who see a direct investment in STEM as the holy grail. Admittedly there was little new to shout about. We can all welcome an additional £100 million to invest in new science facilities at the Babraham research campus in Cambridge, the Norwich research park for environmental and life sciences, the International Space Innovation Centre at Harwell, and the national science and innovation campus at Daresbury, paid for from the Bank Levy. But this was never going to be a 'big spend' budget.

What interested many of my colleagues across Parliament was the fact that STEM is seen as being at the very heart of our economic recovery. On this, all political parties agree. Nowhere was this more evident than in the areas of health care and life sciences where, miraculously, the link between the two is now recognised. As Vince Cable pointed out in the 'Plan for Growth' strategy, the NHS is the largest purchaser of goods and services from the healthcare and life sciences sector, which employs over 100,000 people. The life science sector in the UK accounts for 28 per cent of all UK business R&D.

Benefits of medical research

However, of all the announcements in the Budget, I regarded the decision to accept the Academy of Medical Sciences recommendation to set up a 'health research regulatory agency' as the most important, followed closely by the commitment to drive down the time it takes to recruit first patients to clinical trials.

At present, the UK is a world leader in medical-related research. This is partly because of our superb science base and its close proximity to teaching and research hospitals, but also because we have the NHS and the largest patient data base in the world. To exploit our unique advantages relies not only on money, but the political will to change a system of research and clinical governance that is bureaucratic and resistant to change.

Cancer Research UK found that, after funding for a study had been agreed, it took on average 621 days to recruit the first patient to the clinical trial! The government wants that driven down to no more than 70 days. Establishing a more efficient regulatory system is essential to achieving that goal.

What interested many of my colleagues across Parliament was the fact that STEM is seen as being at the very heart of our economic recovery

Imagine the impetus these changes will give to our life sciences and the incentive there will be for global companies to do their research in the UK! Imagine too, the advantages for the constituents of every one of our MPs who will benefit most from exploiting our research base.

Who said the Romans never did anything for us?

Lord Willis of Knaresborough is Chair of the Association for Medical Research Charities
willisg@parliament.uk

We need to evaluate engagement

It's a complex social process, argues **Eric Jensen**

The 'impact' component in the UK's upcoming Research Excellence Framework (REF) is raising interest among scientists about increasing their public engagement activities and ensuring they can evidence their impacts.

This interest is well-justified given the positive impacts science engagement can offer. For example, my research with visitors to the Cambridge Science Festival shows it is deeply valued. Visitors appreciate the access to cutting edge scientific knowledge and scientists' openness, enthusiasm and eagerness to engage. However, my prior research shows that science engagement can also lead to negative outcomes, if poorly designed or executed.

Training for engagement

As an experienced evaluation researcher and social scientist, I have seen the full range of effective and ineffective practices within UK science engagement. Enhancing quality – alongside increases in quantity – is achievable, but requires changes in training and evaluation.

At the level of scientists' preparation for undertaking public engagement, training in the most important and relevant lessons from across the social sciences could improve the likelihood of positive interactions with publics, while limiting the risk of re-enacting long-discredited practices. Incorporating a précis of social scientific knowledge covering media literacy, audience reception, learning, communication and sociology as an essential, if necessarily brief, element of scientists' qualifications could substantially enhance the quality of science engagement downstream, as well as enriching scientists' education.

Evaluation needed

While understanding principles of good practice is a reasonable foundation for most scientists delivering quality public engagement, those undertaking science engagement frequently or as a full-time career should also make sure that the impacts of their engagement are rigorously evaluated.

Quality evaluation of audience outcomes not only provides evidence of impact for the REF and other institutional requirements. It can also be a crucial mechanism for avoiding the risk of unforeseen negative outcomes. Good evaluation requires upstream planning and clear objectives, and its results should inform science engagement practice. It also requires additional training in relevant social scientific research methods (for example, survey design).

Standards low

Unfortunately, institutions sponsoring professionally supported or delivered science engagement activities do not consistently require high-quality evaluation of audience impacts, for example, approaching a standard suitable for publication in a peer-reviewed social scientific journal. Moreover, long-term impacts are hardly ever assessed.

My experience of most of the evaluation research routinely undertaken by professionals and consultancies in UK science engagement is that it rarely satisfies even the most basic methodological standards. For example, imbalanced 'level of agreement' scales that skew results towards a positive outcome are commonplace. Indeed, I have used such evaluation reports prepared by UK science communication and museum consultancies in my undergraduate 'Surveys and Statistics' module at Warwick University to exemplify poor practice. Within minutes, my students can spot fatal flaws that invalidate these expensive professional evaluations.

Understanding engagement

Part of the problem is that, in the relatively rare instances that science engagement projects commission full-scale independent evaluations, tenders are often assessed either by those whose work is being evaluated or by staff at the funding institution without relevant methodological expertise. Thus, even the professional side of science engagement is rife with shoddy methodology or no evaluation of actual audience impact at all (for example, mere attendance counts and a handful of positive audience quotations).

This failure to routinely ensure rigorous, falsifiable evaluations which are widely disseminated to enhance practice is hindering the field's development and impact. Moreover, the tendency to limit evaluation to the engagement event's duration (as opposed to long-term research assessing impacts over time) is unrealistically myopic and insensitive to contextual factors that modulate impact.

At every level, effective science engagement should be better understood as the complex social process that it is, with concomitant skill, thought and care taken in planning, delivery and evaluation.

Dr Eric Jensen is Assistant Professor of Sociology, University of Warwick
e.jensen@warwick.ac.uk.
warwick.academia.edu/EricJensen

The British Science Association is a registered charity with the Charity Commission No. 212479 and SCO39236

UNIVERSITY OF BRADFORD
MAKING KNOWLEDGE WORK™
Bradford College
Project Part-Financed by the European Union
European Regional Development Fund
City of Bradford MDC
www.bradford.gov.uk

Tales from the water cooler

Barrie Cadshaw reveals the movers and shakers in public engagement

Moving on

'The Royal Institution is obviously in a muddle at the moment..' opined Royal Society chief **Paul Nurse** recently to *People & Science* (p8 of this issue). No sooner did he say it, but I discovered that the Science Media Centre is moving. Literally. It's packing up its office in boxes as I write. After more than a decade in fashionable Mayfair, the SMC has 'de-merged' from the RI and is moving north - to Euston Road, to be precise, and into the swanky offices of the Wellcome Trust.

Digesting filth

The British Science Association's weekly news roundups, the *Science News Digest*, have been deemed to be getting a little racy of late, or so some institution's overzealous profane content and spam blockers would have you believe. The *Digest* has been rejected on the grounds of including words and phrases ranging from 'free energy', 'casinos' and 'overweight and reduce' appearing in the same sentence. Other words causing inbox uproar have included 'sperm' when discussing the breeding practices of nematodes, 'homo' in homo sapiens and 'bang' in the Big Bang...

Misnomer

It's not only spam filters. The Association's use of words doesn't please some people, either. The current Royal Society chief, **Paul Nurse**, told *People & Science* in no uncertain terms recently that he wouldn't have changed the name of the British Science Association two years ago. 'I wouldn't have thrown the BA's name away, frankly. I think it was daft,' he said. 'The whole thing is utterly muddled. I'd have left the brand BA. For scientists and those who are particularly interested in science, they all knew what the BA was. BSA hardly helps. British Science Association might, but British Science Association doesn't communicate what it does. So I would have BA and something underneath it to say what it is.'

Godly rage

Someone who has, if not shaken, certainly rattled a few cages recently is the Astronomer Royal and former Royal Society chief **Martin Rees**. Lord Rees, who professed to having 'no religious beliefs at all' in an interview with the *Guardian*'s **Ian Sample**, won the 2011 Templeton Prize for 'career achievements which affirm life's spiritual dimension.' The Templeton Prize is the largest monetary prize in the world and was set up in 1973 by Wall Street billionaire and Christian, the late John Templeton.

Rees' acceptance of the prize has sparked controversy amongst certain scientists and contemporaries who do not agree that he should have accepted the prize from a body which promotes religion. My favourite headline generated by the story was the Independent's **Steve Connor** who wrote 'For the love of God… scientists in uproar at £1m religion prize.'

The wrong science

March 2011 saw the 17th National Science & Engineering Week. Much news coverage of NSEW was eclipsed by a surfeit of coverage – all science – following the catastrophic earthquake in Japan. As the disaster evolved, the media was full of science, from seismology to tsunamis to nuclear reactors.

Following the explosion at Fukushima's nuclear plant murmurings have been heard amongst the UK's public engagement community about whether nuclear is about to become the next MMR.

Extracurricular to nonexistent?

The Department for Business, Innovation & Skills and the Department of Education are in discussions with several organisations about continuing to fund national schemes that support extracurricular science activities in schools. However, local and regional support has been decimated by the 'austerity measures' and several providers of high quality science activities in schools are facing extreme challenges. The curriculum review in England looks likely to result in a slimmed-down curriculum in the sciences, though whether this will free up teachers to do less 'teaching to the test' is debatable.

Oops

In the last issue, I reported incorrectly that **Simon Festing** was to become the next CEO of Society of Applied Microbiology. He is actually going to become CEO of the Society for General Microbiology, later this year. Sorry Simon!

Do get in touch if you hear any tales at the water cooler that you'd like us to include in the next edition of *People & Science*.

Barrie Cadshaw is at the British Science Association
barrie.cadshaw@britishscienceassociation.org

The Open University

“Help push the boundaries of innovation and take your career to the next level”

Science, engineering and technology at The Open University.

If you want to help shape our future while broadening your own career horizons, our wide range of science, engineering and technology courses lead to qualifications that will get you noticed by the people that matter. Our study method helps you develop skills you can put into practice at work straight away, using a blend of study materials, online forums and even mobile media to help you fit study around work.

Welcome to Britain's favourite university.

Get ahead

- Chemistry
- Computing & ICT
- Design & Innovation
- Engineering & Technology
- Environmental Science
- Environmental & International Studies
- Geosciences
- Health Sciences
- Life Sciences
- Mathematics & Statistics
- Physics & Astronomy
- Systems Thinking in Practice
- Technology Management

bcs Educational Affiliate · IET Business Partners · cisco · The Institution of Engineering Designers

Get ahead

- www.openuniversity.co.uk/set
- 0845 300 8846 Quote: GAMAGB

INSPIRING LEARNING

The Open University is incorporated by Royal Charter (RC 000391), an exempt charity in England and Wales and a charity registered in Scotland (SC 038302).